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Towards a smart grid Communication

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Abstract

Smart grids are one of the technological answers to the '3 x 20' objective of the 2020 climate and energy package of the European Union: 20% renewable energies, saving energy and reducing emissions green house gas. The effective insertion of the production of renewables of intermittent nature (wind and photovoltaic) and new uses of electricity (heat pumps, electric vehicles...) in the electric system requires the design of equipment "smart", thanks to the new technologies of information and communication. [1, 2, 5]).

A major challenge is to be able to use five key technology area :Integrated Communications, sensing and measuring ,advanced components, advanced control methods, improved Interfaces and decision support in an industrial context demanding in terms of quality, safety, security and cost.

This paves the way for researchers to propose relevant and sustainable solutions.

This paper tries to focuss on the importance of Information and Communication Technology (ICT), which ensures a two way communications with a collection of secure and reliable data from sensors and meters located throughout the grid and transmitted directly to the grid operator's control room.

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I. Introduction :

Many definitions and several viewpoints are given to explain what is a smart grid . One may define a

smart grid as an electricity network that can intelligently integrate the actions of all users connected to it generators, consumers and those that do both , in order to efficiently deliver sustainable, economic and secure electricity supplies. This definition is extended to include the means to transform the electric production from a centralized producer- controlled network to a more consumer interactive one. [4,6]

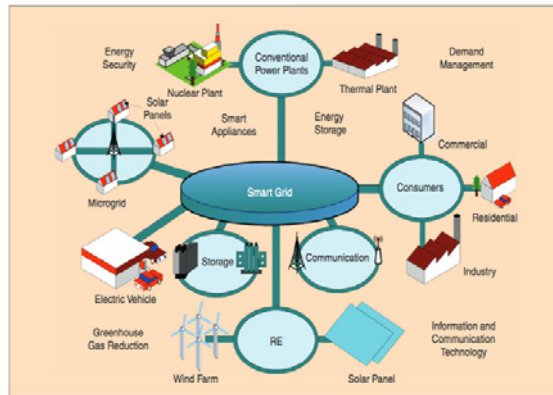


Figure 1 : The future electrical grid

II. ICT For Smart Grid

II.1 Conceptual model of Smart grid

Various efforts have been made regarding the standardization of smart grid communication. A number of organizations that are working on this : IEEE, International Electrotechnical Commission (IEC), and the National Institute of Standards and Technology (NIST). NIST has published standards include NIST 1108 (describes, among others, smart grid inter-operability and requirement of communication networks); and NIST 7628 (describes smart grid information security issues). NIST has also proposed the Smart Grid conceptual Model which gives the characteristics, uses, behavior, interfaces requirements standards of the SG. [3]

This concept of smart energy encompasses a wide range of research issues : Distributed control , fault detection , prediction, grid stability and stability, data and communication, demand response.

Thus Smart Grid is a multidisciplinary area showing many challenges. The next section is dedicated of one of these challenges : the communication infrastructure.

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